

IN THE SPECIFICATION:

On page 3, starting at line 11, please amend the specification as follows:

Referring to Fig. 2, there is shown an optical element 5A which can rotate plane of polarization of polarized light 20A in a non-reciprocal manner, using Faraday-effect, which is called a Faraday rotator and is an essential building block for various optical devices such as isolator, circulator, and optical switch. A Faraday rotator 5A includes an optical element 25A and a magnet 30A surrounding the optical element 20A 25A.

The magnet is magnetized and positioned in such a way that its magnetic field is aligned with an optical axis of the optical element. As a result, plane of polarization of polarized light 20A from a source such as a laser or an optical fiber traveling along the optical axis of the element will be rotated by a desired angle θ . This rotation may be clockwise or counterclockwise and its magnitude depends on Verdet constant V of optical element, magnetic field strength (B), and length of optical element (L). This rotation is expressed as:

$$\theta = VBL$$

On page 18, starting at line 4, please amend the specification as follows:

Referring now to Fig. 4, and in a preferred embodiment of the present invention, there is shown an integrated multipass and multistage optical isolator 100 having a particular geometry for higher levels of optical isolation. The geometry of multistage optical isolator 100 is obtained using three or more polarizers 105. A second midstage polarizer 105A 105B serves as the output polarizer of first stage of isolation 110 and the input polarizer to the second stage 115 of isolation. The back surface of the polarizer is coated with a high reflection coating to form a mirror 120 so as to redirect light 125 into the second stage 115. Compact isolator 100 preferably has an isolation of greater than 50 dB. The angle of incidence β of the light 125 to Faraday rotator material 130 is selected to set the desired number of reflections which in turn allows the desired number of passes through rotator 130. Length L_3 of Faraday rotator material 130 is selected in accordance with the given incident angle β , magnetic field, Verdet constant, and number of bounces such that the total rotation of the polarization state is 45° from the input polarizer 105A of first stage 110 to output polarizer 105B. Similarly, another rotation of 45° occurs second stage 115 to further rotate the polarization an additional 45° . Output light 135 of isolated light 125 from two stage unit is orthogonal in polarization to input light 140 125.

On page 20, starting at line 20, please amend the specification as follows:

Referring now to Figs. 7A and 7B, and in a preferred embodiment of the present invention, there is shown a semi-double isolator 225 having an isolation of over 70 dB. In practice, a slab of TGG crystal which is sandwiched between two slab of magnets cannot produce large extinction ratio mainly due to residual stress at sharp corners of slab TGG crystal and non uniformity of field generated from slab magnets. Therefore, it is difficult to fabricate an isolator with large isolation, i.e., close to 40dB for single stage, using slab magnets and slab TGG crystal geometry. To overcome this issue, semi-double isolator 225 is modified from the slab configuration to replace slab TGG crystal with cylindrical rod 230 and replace slab magnets with a piped-shaped magnet 235. Polarizers 240 and a reflector 245 are configured relative to cylindrical rod and piped-shaped magnet 225 235 for directing light 250 therethrough.